Remarks

The numbered paragraphs of the office action are responded to through the corresponding numbered paragraphs below. The applicant has addressed each issue in turn and, for clarity, has provided a heading for each issue.

Specification

1. The Examiner objected to the specification because of the definition of "reasonable ductility." The Examiner appears to be confusing the commonly used ceramic Aluminum Titanate with Aluminum alloys. There is a large volume of refernces in archivable scientific journals supporting the applicant's position that Aluminum Titanate is a ceramic, possessing brittle – not ductile – properties. A selection of these references is enclosed with this response. Aluminum Titanate, chemical formula Al_2TiO_5 or $Al_2O_3 .TiO_2$ which might also be called Aluminum Titanium Oxide, the "ate" ending on the Titanate designating an oxide compound according to the accepted nomenclature. Aluminum Titanate is also called Tialite in some publications. The Examiner's apparent confusion is understandable since the nomenclature for ceramics in general is confusing, although many attempts have been made to standardize it. One of the definitions of ceramic materials is: a metal or metals combined with a non-metal or non-metals. The metals in this case being Aluminum and Titanium and the non-metal being Oxygen. Mixing the fine powders of Al2O3 and TiO2 then firing the mixture at a high enough temperature to combine the Al2O3 with the TiO2 into Al2TiO5 or $Al_2O_3 .TiO_2$ forms Aluminum Titanate. Other methods may also be employed to obtain specific properties of the ceramic that cannot be obtained by the usual method of manufacture. Another material which is sometimes referred to as Aluminum Titanate has the formula $AlTiO_3$.

In the book "Phase Diagrams for Ceramists," edited and published by The American Ceramic Society," copyright 1964, pp 123, Figure 316, the phase diagram of $Al_2O_3.TiO_2$ is shown as a ceramic. Aluminum Titanate properties are also listed on page 677 of the ASM International "Engineered Materials Handbook, Volume 4" under Table 1 – Properties of Structural Ceramic Materials. This table is provided in the section labeled "Key Structural Ceramic Characteristics" in the chapter on "An Overview of the Ceramic Design Process." The formation of Aluminum Titanate as a ceramic is also noted in the ASM International Publication, "Ceramic Joining" by Mel M. Schwartz. Ceramic manufacturers acknowledge that Aluminum Titanate is a ceramic. For example, the web site for LoTec., Inc., referring to their ceramic products notes "Unlike the 'state-of-the-art' low CTE ceramics (e.g., aluminum titanate, fused silica), . . ." Moreover, there are numerous issued U.S. Patents that deal with Aluminum Titanate and which identify Aluminum Titanate as a ceramic. These patents include: U.S. Patent No. 5,066,626 issued to Fukao et al., U.S. Patent No. 4,895,815 issued to Olapinski et al., U.S. Patent No. 5,153,153 issued to Freudenbert et al., U.S. Patent No. 5,422,324 issued to Noguchi et al., U.S. Patent No. 4,327,188 issued to Endo et al., and U.S. Patent No. 5,346,870 issued to Noguchi et al.

In the book "Modern Ceramics," edited by J. E. Hove and W. C. Riley, published by John Wiley and Sons, Inc., New York, 1965, in the introduction to Chapter 8, it is stated: "As mentioned in the previous chapter, although ceramics constitute an important class of materials, their general brittleness has been a severe limitation to their use." Enclosed with this response are about 66 references, with abstracts, from the Cambridge Scientific Abstracts" which concern Aluminum Titanates. Also included are a copy of

the LoTEC, Inc. web page and copies of the referenced U.S. Patents, downloaded from Lexis-Nexis, which concern Aluminum Titanates. Since ceramics are acknowledged to be brittle (as indicated in the Examiner's Office Action, page 2, applicant's specification defines reasonable ductility as being more ductile than the brittle ceramic materials used in the plug head) and since it is well established that Aluminum Titanate is not an alloy of aluminum but is in fact a ceramic, it is therefore clear that, despite the Examiner's apparent confusion regarding Aluminum Titanate, the disclosure is enabling to one of ordinary skill in the art, that Applicant's arguments of in the previous Office action response are not in conflict with the Applicant's specification. In sum, Applicant believes that considering that Aluminum Titanate is a ceramic rather than an aluminum alloy, Applicant's disclosure is enabling for the amended claims (specifically claims 13 and those claims dependent on claim 13) and the Applicant's arguments regarding the Maier et al. reference are correct. Reconsideration and withdrawal of this objection is respectfully requested.

Claim Rejections

2. The Examiner provided the reference to 35 U.S.C. § 112. The Applicant believes that no response is required for this paragraph.

3. The Examiner rejected claims 13-20 under 35 U.S.C. § 112, first paragraph, stating that "the specification . . . does not reasonably provide enablement for a plug head band made of a ductile material." The Examiner further states that "Applicant has argued that aluminum and its alloys are not ductile; however aluminum and its alloys are specifically disclosed (and claimed) as being reasonably ductile." In Applicant's Office action response Applicant distinguished Applicant's invention from that of Maier et al.

by noting that Maier et al. teaches away from Applicant's use of a ductile material by using a material that is "substantially free of plastic deformation." Maier et al. appears to use Aluminum Titanate, which as described above and in Maier et al., *see* column 4 lines 55-56, where it is acknowledged to be a ceramic material. Applicant has not intended to give the impression that aluminum and its alloys are not ductile, rather Applicant has intended only to point out the differences between Applicant's use of Aluminum alloys and the like which are ductile materials and Maier et al.'s disclosure of ceramic materials, which are by definition brittle not ductile. Applicant apologizes for any confusion caused to the Examiner. Applicant respectfully requests reconsideration and withdrawal of this rejection.

Claim Rejections – 35 USC § 112

4. The Examiner provided the basis for the rejections under 35 USC § 112 in this Office action. The Applicant believes no response is required for this paragraph.

5. The Examiner rejected claims 13-20 under 35 USC § 112, second paragraph, as being indefinite. Specifically, the Examiner indicated that the "conflicting definitions of ductility presented in Paper No. 7 and the specification and claims renders the claims indefinite." As previously noted, the Applicant believes that no conflicting definitions of ductility were presented. The Applicant respectfully requests reconsideration and withdrawal of this rejection.

Regarding claim 14, Applicant has requested that this claim be cancelled.

6. The Examiner indicated that the claims have been examined as best understood by the Examiner. The Applicant appreciates the confusion caused by the term Aluminum Titanate which the Examiner apparently understood to be an Aluminum alloy. Applicant

hopes that the prior information serves to clear up this confusion by pointing out rather than being a ductile Aluminum alloy, Aluminum Titanate is a brittle ceramic. Applicant believes that no response is required for this paragraph.

Claim Rejections – 35 USC § 103

7. The Examiner provided the citation to 35 U.S.C. 103(a) that forms the basis for all obviousness rejections set forth in this Office action. The Examiner also notes that the application currently names joint inventors and that the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made. The Applicant confirms that the claims of this application were and are commonly at the time the invention was made. Applicant believes that no further response is required for this paragraph.

8. The Examiner rejected claims 13-20 under 35 U.S.C. 103(a) as being unpatentable over Maier et al. and Szymaszek et al. The Applicant has previously requested that claim 13, on which claims 14-20 depend, be amended to point out that the plug head band of Applicant's invention is made of a ductile material. Applicant believes that the references, in particular Maier et al., specifically teach away from the use of ductile material by describing the use of a material that is "substantially free of plastic deformation." See, Maier et al., column 3, lines 40-47. As Applicant has requested that claims 13, on which claims 14-20 depend, be amended to add this element of a ductile material, which Applicant believes is not only not disclosed by any cited or otherwise known reference, but is actually taught away from by the Maier et al. reference, Applicant believes that this requested amendment fully addresses the Examiner's

rejections of this paragraph. Applicant respectfully requests reconsideration and withdrawal of this rejection.

Response to Arguments

9. The Examiner has indicated that Applicants arguments filed 30 June 2000 have been considered but were not found to be persuasive. As previously noted, Aluminum Titanate is not a Aluminum alloy, as described in the specfication, but is rather a brittle ceramic. Applicant apologizes for the confusion caused by the term Aluminum Titanate. Applicant understands that this term can lead a person to believe that this material is an Aluminum alloy. Nevertheless, Applicant believes that it is clear from Applicant's definition of reasonably ductile that it means more ductile than a ceramic and that it is clear that Aluminum Titanate is a ceramic. Applicant respectfully requests reconsideration and withdrawal of this rejections of this Office action.

Conclusion

10. The Examiner indicated that this action is made final. Applicant is filing this preliminary amendment within the extension period and has requested an extension of time with fee, with a Continued Prosecution Application.

11. The Examiner provided information concerning communication with the Examiner on this case. Applicant appreciates the Examiner's willingness to discuss this case and believes that no specific response is required for this paragraph.

The Applicant has requested that claim 14 be cancelled. Applicant has described that Applicant believes Applicant's prior response is not in conflict with the specification

as previously described. Applicant believes that this response should place this application in a condition for allowance.

In view of the foregoing, and in summary, Applicant believes that all issues and points of the Examiner's Office Action have been addressed and that all remaining claims, claims 13 and 15-20 are patentable over the prior art. Reconsideration and allowance of the application is respectfully requested.

Respectfully submitted this 19th day of January, 2001.

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